The Impact of BART on Economics and Finance

Interpretive Summary of the Final Report

December 1979

a report by the Metropolitan Transportation Commission

Metropolitan Transportation Commission

Hotel Claremont, Berkeley, California 94705

The Metropolitan Transportation Commission was established by California law in 1970. Its 19 members represent city and county governments and federal, state and regional agencies that deal with transportation and urban development in the nine counties of the San Francisco Bay Area. MTC's duties include:

- preparing, periodically revising and implementing a regional transportation plan that serves the present and future needs of the nine counties;
- reviewing requests by Bay Area agencies for transportation funds from the state or federal government;
- monitoring the effectiveness and performance of the Bay Area's transit operators.

As a part of its transportation-planning effort, MTC undertook the study of BART that is described in this report. The report is distributed under the sponsorship of the U.S. Department of Transportation and the U.S. Department of Housing and Urban Development. The United States Government and MTC assume no liability for its content, or for the use made thereof.

The photograph on page 12 was supplied by Joel Markowitz of MTC. Those on the cover and on page 8 were provided by the Bay Area Rapid Transit District.

Cover photograph: *BART's train yard and repair shop at Hayward. In 1976, 375 of BART's 1865 employees were working here and at the Concord and Richmond yards on rolling stock maintenance.*

Introduction

BART – the Bay Area Rapid Transit system – is a commuter-oriented rail system that serves three counties on San Francisco Bay. It began operating in September 1972. BART's average weekday patronage in mid-1978 was about 146,000 one-way trips a day, and the BART staff expects it to reach 180,000 trips by 1981.

In 1972, the Metropolitan Transportation Commission began the BART Impact Program – a study of BART's effects on the people, the communities and the region that it serves. The program was completed in December 1978. It was a policy-oriented effort, seeking information that would help policy-makers in the Bay Area and elsewhere to make decisions about transportation systems, urban development and environmental management. The program included studies of BART's effects on transportation and travel within the Bay Area; on land use and urban development; on the regional economy; on social institutions and life styles; on public policy; and on the environment.

A major element in the program was the Economics and Finance Project. It studied the impacts of the construction and operation of BART on the Bay Area's economy and public finance, and the impact of its transportation service on employment and regional economic development.

This summary describes the Project's principal findings and conclusions, and discusses what the BART experience may mean for other metropolitan areas where similar rail transit systems are being planned or built. It has been written for public officials and others who have a general interest in urban transportation systems. Details about technical aspects of the Project appear in the reports that are listed in Section 8.

Abstract of Findings

conomic Impacts of Constructing BART

BART's capital spending of $1.6 billion had a multiied impact of $3.1 billion in the Bay Area. In no year did ART's impact exceed 0.5% of the gross regional product.

Although Bay Area construction wages in the buildg trades rose by about 40% during the years 1964-1969, is increase was consistent with long-term regional trends; it doesn't seem to be attributable to BART's construction expenditures.

Financial Impacts of Constructing BART

Unlike more recent rapid-transit projects, some 80% of BART's cost was financed locally, mainly by bonds supported by property taxes and a sales tax. When all of the bonds have been retired, taxpayers in the three BART counties will have paid more than $1.7 billion to build BART. Since the Federal government now provides as much as 80% of the funds for transit projects, other regions are unlikely to assume such a burden of debt.

Households contribute about two-thirds of the tax revenues that service BART's bonds and cover most of its operating deficit. The BART tax burden shows a regressive distribution – that is, the greatest relative burdens fall on low-income households.

BART's heavy borrowing affected neither the cost of money borrowed by other public bodies nor the credit ratings of such bodies.

Economic Impacts of Operating BART

The calculated net cost of operating BART in 1976 was $47 million. The ultimate effect of this amount on the gross regional product was about $149 million. Its effect on personal income was about $52 million.

BART's Impact on Regional Development

Proponents of a new rapid-transit system often suggest that the system will enhance its service area's competitive position by expanding employment opportunities, enabling businesses to operate more efficiently, and promoting better utilization of the region's resources. The Economics and Finance Project found little quantitative evidence that BART had contributed substantially to any of these objectives in the Bay Area.

A new transit system may affect location decisions by businesses *within* its region, but not the region's ability to compete with other areas. Commercial development near transit stations – often cited as evidence of a system's impact on regional development – may merely represent relocation, not new growth induced by transit.

Contents

1 BART and Its Setting

BART's Setting

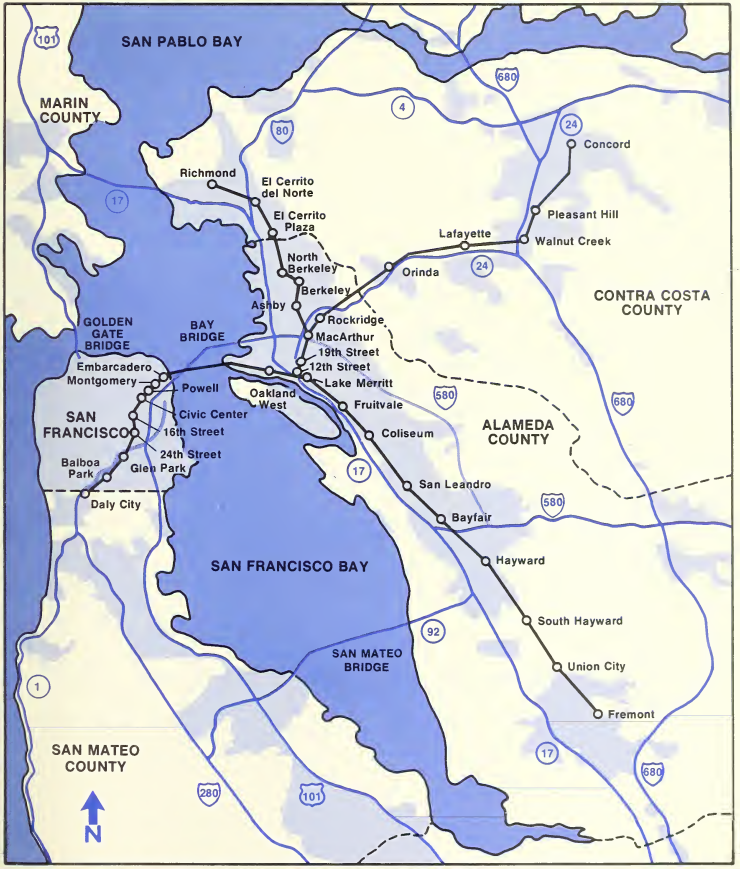
The BART District comprises three counties that have a developed or developable area of 460 square miles. The City and County of San Francisco has been fully developed since the 1960s. Alameda County was two-thirds developed by 1975, and Contra Costa County was about one-half developed. In 1970 the three counties had a combined population of 2.4 million. In 1975 about 1 million people were living within 1 mile of BART trackways. BART enters or traverses 14 cities and several unincorporated areas.

Development patterns in the San Francisco Bay Area are shaped by the Bay itself and by its surrounding hills. North-south corridors of urban development extend along both sides of the Bay, and another corridor runs eastward from Berkeley into the central part of Contra Costa County.

Before World War II, urban growth had been concentrated in San Francisco, Oakland, Berkeley, and Richmond — the older cities on the shores of the Bay. During the past 25 years, development has become more dispersed and suburban communities have grown dramatically.

Rapidly growing areas within the District include southern Alameda County and central Contra Costa County.

The Bay Area's total employment in 1975 was a little more than 2 million. The three BART counties accounted for 53 percent of that total, while Santa Clara County and San Mateo County represented 36 percent.


SAN PABLO BAY
MARIN COUNTY
Richmond
El Cerrito del Norte
El Cerrito Plaza
North Berkeley
Berkeley
Ashby
Orinda
Lafayette
Concord
Pleasant Hill
Walnut Creek
CONTRA COSTA COUNTY
GOLDEN GATE BRIDGE
BAY BRIDGE
Rockridge
MacArthur
19th Street
12th Street
Lake Merritt
Fruitvale
Coliseum
Oakland West
Embarcadero
Montgomery
Powell
Civic Center
16th Street
24th Street
Glen Park
Balboa Park
Daly City
SAN FRANCISCO
ALAMEDA COUNTY
San Leandro
Bayfair
Hayward
South Hayward
Union City
Fremont
SAN FRANCISCO BAY
SAN MATEO BRIDGE
SAN MATEO COUNTY
N
101
80
680
4
24
17
580
92
1
280
urbanized area
federal highway
interstate highway
state highway
BART
BART station
0 1 2 3 4 5m
0 1 2 3 4 5 6 7 8km

The BART System

Configuration BART's four lines radiate from downtown Oakland. The lines are named for their termini: The Richmond line, the Concord line, the Fremont line, and the Daly City line. All of the lines pass through older, medium-density residential and industrial areas; the Concord and Fremont lines extend into newer, low-density suburbs.

The 71-mile system includes 20 miles of tracks in subway tunnels, 24 miles on elevated structures, and 27 miles at ground level. The subways include the Transbay Tube, a tunnel through hills east of Berkeley, and sections in Downtown Berkeley, Oakland and San Francisco. About 85% of BART's trackways lie within, beside or below the rights of way of other transportation routes — arterial streets, highways or other railroads.

In the commercial centers of San Francisco and Oakland, BART provides local subway service. Its stations there are 0.3 to 0.5 miles apart. In the suburbs, where stations are 2 to 4 miles apart, BART serves as a commuter railway.

Stations There are 34 stations in the system, and 23 of them have parking lots. The lots provide about 20,000 spaces; capacity at individual stations ranges from 240 to 1,600 cars. BART and other transit agencies provide bus service to all stations.

Coordinated Development During BART's construction, several cities carried out municipal-improvement projects that were coordinated with work on BART. These improvements included the development of plazas and pedestrian malls, and the refurbishing of important downtown streets. The redevelopment of Market Street in San Francisco is a noteworthy example. Other examples can be seen in Berkeley and Oakland.

Train Operations BART was opened in five stages, from September 1972 to September 1974. The last section to open was the Transbay Tube linking Oakland and the East Bay with San Francisco and the West Bay.

Between 6:00 AM and 6:00 PM on weekdays, trains run between Concord and Daly City, between Fremont and Daly City, and between Richmond and Fremont. The minimum headway (time between successive trains) on all three routes is 12 minutes. Where two routes converge (as in San Francisco) the minimum headway is 6 minutes.

On weekday evenings (6:00 PM until midnight), trains run on two routes only: between Concord and Daly City, and between Richmond and Fremont. The minimum headway during the evening is 20 minutes. On Saturdays and Sundays, trains run on these same two routes. The minimum headway on Saturdays is 15 minutes, and on Sundays 20 minutes.

BART plans to expand its service significantly during the next two years by starting direct service between Richmond and Daly City, and by increasing the frequency of trains on all lines during peak-travel periods.

Fares Fares range from $0.25 to $1.45, depending upon trip length. Discount fares are available to the physically handicapped, children, and persons aged 65 or older.

Ticketing Tickets dispensed by vending machines carry magnetically coded values as high as $20.00. Fare gates are operated by inserting a ticket. Exit gates compute the fare from a code added by an entry gate, and deduct the fare from the ticket value.

Station Interiors BART stations show high standards and individuality of design, enhanced by the use of distinctive materials and works of art. The stations are notably quiet. Noise levels generated by arriving and departing trains are low, in comparison with current standards of the rapid-transit industry.

BART Trains A BART car is 70 feet long and has 72 seats. Trains are from 3 to 10 cars long. Their maximum speed in normal operations is 70 miles an hour. The average speed is 38 miles an hour, including station stops. Each train stops at all stations on its route.

The cars are attractive and comfortable. Their interior features include air-conditioning, carpeting, tinted window glass, upholstered seats, and a public address system for announcement of stations and transfers.

The comfort of a BART ride is outstanding. BART cars run with very little vibration or sway, for four important reasons: BART tracks are broad-gaged; they have continuous, welded rails; they are well maintained; and each car is supported by pneumatic cushions, which are more effective than springs in absorbing mechanical vibration.

Sound levels in the cars are low. Patrons hear less noise than they would in cars of most other systems, and they can converse in a normal voice.

Trains are controlled automatically by a computer at BART headquarters. An operator on board each train can override automatic controls in an emergency.

Access to BART During morning rush periods, about 60% of BART's patrons ride from their homes to their stations in private automobiles. Half of the rest use buses, and half walk. In downtown areas, 75% of BART's riders walk to and from their stations. Most of the rest use buses. Some 65% of BART's passengers are traveling between their homes and their jobs. The average length of a trip on BART is 13 miles.

2 Studying BART's Impacts

The Economics and Finance Project was conducted for MTC by McDonald & Grefe, Inc. (San Francisco). It was supported by the U.S. Department of Transportation and the U.S. Department of Housing and Urban Development.

The Project studied the impacts of the construction and operation of BART on the Bay Area's economy and on public finance. It sought to define and measure the effects of BART's expenditures on regional sales, income and employment; on the incidence and distribution of tax burdens; and on aspects of local public finance, including the cost of borrowing and the mechanisms used for financing other capital improvements. It also examined BART's influence on the employment of members of minority groups, both in construction jobs and in operating jobs.

The most difficult impact to evaluate was BART's influence on the Bay Area's economic development. This subject was of interest because some of the most common arguments for rapid-transit improvements depend on alleged economic benefits: increased employment, better access to a broader labor force, better business communication, and consequent advantages in attracting new industry and commerce.

Scope of the Project

The Project dealt only with impacts that affected the Bay Area as a whole. Local impacts within the region (such as changes in land use or housing prices) were studied by the Land Use and Urban Development Project, another element of the BART Impact Program. That project's findings have been published separately.

Research Methods

The No-BART Alternative In many cases, the Project measured BART's impacts by comparing actual conditions in 1976 (after BART had begun service) to hypothetical conditions that probably would have existed in 1976 if BART hadn't been built.

These hypothetical conditions constituted the No-BART Alternative (NBA) — a concept that was used uniformly in several of the BART Impact Program's projects. The NBA was based on an historical study of economic and political decisions in the Bay Area. The study suggested that, if BART hadn't been built, the region would have had in 1976 a public-transit system much like the one that actually was operating there in 1973 (the year before BART began transbay service). Hence the 1973 system with minor changes, was used as the public-transit component of the NBA. It consisted chiefly of local and express bus service, provided by three operators:

- the Alameda-Contra Costa Transit District (AC Transit), offering local bus service in the East Bay and transbay service to downtown San Francisco;
- Western Greyhound Lines, providing express buses from central Contra Costa County to Oakland and San Francisco;
- the San Francisco Municipal Railway (MUNI), operating buses, streetcars, trolley cars and cable cars on a dense network of routes within San Francisco.

The NBA model assumed no highways besides those that existed in 1976, nor did it consider what changes in the Bay Area's transportation system might have been necessitated after 1976 by increasing travel demand and traffic congestion.

Since there is no way to determine with certainty how the transportation system would have developed without BART, some features of the NBA are debatable. Different assumptions clearly would have altered the magnitudes of some impacts. For example: If the NBA had assumed that Greyhound service between Berkeley and Contra Costa County would be replaced by public bus service (as has happened in two other corridors), the analysis of tax burdens under the NBA would have produced different results.

Study Areas The size of the geographical area considered during the analysis of each of BART's impacts was dictated by the nature of the impact. For example:

- Analyses of the economic impact of BART's capital and operating expenditures were based on an economic model of the entire nine-county Bay Area, which is regarded as one economic unit for many planning purposes.
- Analyses of BART's impacts on tax burdens and on public finance were confined to the three BART counties. Only in these counties do residents pay taxes to support BART.
- Studies of BART's effects on the labor market were restricted to the site of the primary labor pool — the San Francisco-Oakland Standard Metropolitan Statistical Area, as defined by the U.S. Bureau of the Census.

3 Economic Impacts of Constructing BART

BART's Capital Cost

The first published estimate of the cost of building and equipping BART appeared in the Composite Report* that the BART District received in 1962 from its engineering and financial consultants. That report said that BART's capital cost would be about $994 million, and that the major elements of the system could be built in about six years (between mid-1963 and the end of 1968).

Construction didn't begin until mid-1964 and wasn't completed until September 1974, when the Transbay Tube was opened for service. Minor construction work is continuing still.

In March 1977, BART's actual capital cost had reached $1,554 million. According to a BART report issued in 1975, the cost will exceed $1,636 million by the end of 1980.**

These amounts don't include some $755 million for interest on the bonds that supplied a large fraction of BART's construction funds.

The chief reasons for the escalation of BART's cost were changes in its scope and design, and serious construction delays during years of rapid, unanticipated price inflation.

BART's Capital Spending in the Bay Area

During the years 1964 through 1976, BART spent about $1.2 billion in the Bay Area for construction and for procurement of equipment. This spending produced three kinds of economic impacts on regional sales and income:

- Direct impacts: BART's own purchases;
- Indirect impacts: purchases of raw materials and intermediate products by BART's suppliers;
- Induced impacts: purchases by households, using income created by the direct and indirect impacts.

The total of these impacts was $3.1 billion. In no year did the total of BART's impacts exceed 0.5% of the Bay Area's gross regional product.

Effects on Construction Employment

The direct labor requirement for constructing BART was nearly 31,000 person-years of employment during the years 1964-1976. Total requirements (direct, indirect, and induced) were more than 75,000 person-years. Without information about each worker's actual term of employment, the number of jobs represented by these person-years can't be calculated.

Construction employment in the Bay Area during the years 1963 to 1973 ranged from 80,000 to 91,000 jobs. BART's construction employment peaked in 1968, when it used 5,000 workers. Total construction employment in the Bay Area in that year was about 85,000, so BART provided about 6% of it.

BART's impact on total regional employment was minimal. In no year did BART construction jobs exceed 0.3% of the jobs in the Bay Area.

Effects on Employment of Minority Groups

Most of BART's construction occurred before affirmative action or equality in employment gained their present currency. Members of minority groups constituted 22% of the work force in the San Francisco-Oakland SMSA, 36% of BART's entire construction force, 16% of all its skilled workers, 20% of its skilled journeymen and 11% of its skilled foremen. The construction of BART introduced the concepts of affirmative action and equal employment opportunity into local construction trades, on a large scale, for the first time.

Impact on Construction Wages

It has been suggested that a public project as large as BART could have inflationary effects on a regional economy, and that such effects would be apparent in construction wages.

Although Bay Area construction wages in the building trades rose by 40% during the years 1964-1969, this increase was consistent with long-term trends; it doesn't seem attributable to BART's construction expenditures. This conclusion is based on a review of the total demand for labor in the Bay Area, a statistical analysis of the

*Parsons Brinckerhoff-Tudor-Bechtel, Smith Barney & Co., Stone & Youngberg, and Van Beuren Stanbery. 1962. *The Composite Report, Bay Area Rapid Transit.*

**About 10% of this will have been spent on the MUNI-Metro project in San Francisco — a $160-million modernization of streetcar lines of the San Francisco Municipal Railway (MUNI). This project, which is scheduled for completion next year, has included the construction of tunnels (3.2 miles long) and underground stations. MUNI-Metro will share concourses with BART's Embarcadero, Montgomery Street, Powell Street and Civic Center stations. The 1.7-mile MUNI-Metro tunnel that connects these four stations is immediately above the corresponding BART tunnel.

components of wage increases,* and interviews with officials of construction unions and construction companies. There was no significant correlation between BART construction activity and changes in heavy-construction wages in the Bay Area.

*The three components analyzed were local supply and demand, the usual inertia of wage increases, and a component that reflects general inflation.

Effects on Personal Income

The direct and indirect effects of BART's capital expenditures on personal income totalled $927 million during the years 1963-1976. This was less than 0.5% of total estimated personal income in the region during that period.

About 12.5% of the $927 million accrued to members of minority groups.

4 Financial Impacts of Constructing BART

BART's Capital Financing

The Composite Report of 1962 proposed that BART's capital costs would be financed from the sale of $792 million in general-obligation bonds; the bonds would be retired by 1999, using revenues from a property tax levied in the three BART counties. BART also would receive $135 million from toll-revenue bonds issued by the California Toll Bridge Authority, to underwrite costs of the Transbay Tube and its approaches. Rolling stock would be purchased with $73 million raised through sale of bonds to be serviced by revenues from BART's operation.

As construction costs escalated and estimates of operating revenues were revised, the financing plan was altered to include:

- $41 million more from bridge tolls, to meet increases in the cost of the Transbay Tube;
- $150 million for rolling stock, provided by revenue bonds issued in 1969 and supported by a 0.5% tax on retail sales in the three BART counties;
- $12 million from the sale of general-obligation bonds that would be repaid with revenues from a property tax collected in Berkeley alone;*
- $325 million from Federal capital grants;
- $179 million from other sources.

Interest on the bonds, to be repaid from the same sources as the bonds themselves, will total $763 million. The interest was not capitalized. BART's general-obligation bonds were issued at an average interest rate of 4.14%, barely higher than the 4% anticipated in the Composite Report.

BART's dependence on local financing sets BART apart from more recent rapid-transit projects. When all of BART's bonds have been retired, taxpayers in the three BART counties will have paid over $1.7 billion in local property taxes and sales taxes for capital and interest. Since the Federal government now provides as much as 80% of the money for public-transit projects, other regions are unlikely to assume a similar burden of debt.

*The 1962 plans for BART had assumed that the BART tracks in central Berkeley would be placed in subway tunnels, while the tracks in other places would be elevated. In 1966, voters in Berkeley chose to have *all* the tracks placed underground. To raise the additional funds that this would require, they elected to pay higher property taxes.

Present Revenue Sources and Tax Burdens

BART's original financial plan assumed that property-owners and businesses would be the main beneficiaries of BART's service; this would justify the use of property taxes for much of BART's financing. The remainder of the financing would come from bridge tolls (paid by motorists who presumably would benefit from BART's relieving congestion on the San Francisco-Oakland Bay Bridge) and from fare revenues.

When the plan was altered and expanded, as described above, the burden of financing BART was redistributed accordingly. The text that follows describes how this burden is being borne now.

Distribution of Property-Tax Burden About 65% of the money that BART gets from property taxes in the three BART counties is paid by households—as owners of houses, users of rented dwellings, or purchasers of products supplied by businesses that shift a part of their property-tax burdens to consumers.

About 24% is paid directly by businesses — i.e., it isn't shifted to consumers.

The rest (11%) is supplied by sources outside the BART counties. These sources include tourists, businesses,

and the California state treasury (which compensates the BART counties for revenues lost through certain kinds of property-tax exemption).

This distribution of the property-tax burden reflects the percentage of housing in the BART District's total assessed value. If the percentage changes, the burden borne by households will change accordingly.

Distribution of Sales-Tax Burden The revenue bonds that were issued in 1969 to raise $150 million for BART rolling stock were retired by 1977. The total cost of this financing (including interest) was $188 million,provided by the 0.5% sales tax noted above. Households paid more than 70% of this. Local businesses paid nearly 20%, and tourists or businesses outside the BART counties paid 10%.

When the bonds were retired, the sales tax was continued. Most of the revenue that it provides is used to cover the major part of BART's operating deficit.

Impact on Bridge Tolls Some toll revenues from the Bay Bridge were used for supporting the bonds that financed the Transbay Tube. The bonds were paid off by 1976.

Since there is no evidence that Bay Bridge tolls would have decreased if no revenues had been diverted to this purpose, there is no reason to conclude that BART affected toll rates.

Impact on Allocation of Local Revenues

Local public projects (such as street improvements, parks and pedestrian overpasses) usually are financed by local general revenues. This wasn't true, however, of most of the local projects that were coordinated with the building of BART. Generally, such projects were supported by state or Federal funds, or by special-district tax assessments. Hence these projects neither changed the allocation of general revenues nor caused increases in local property taxes.

BART Tax Burden versus Household Income

A tax whose burden is distributed among taxpayers according to their presumed ability to bear it is called a *progressive* tax. A tax whose burdens on individuals (or households) aren't demonstrably proportional to their presumed ability to pay is called a *regressive* tax.

The capital costs of public transit systems are almost always financed through taxes that tend of be regressive. This was true of the financing of BART.

To assess the extent to which BART's tax burden might be regressive, the Economics and Finance Project studied the impact of BART taxes on households of various sizes, ages, incomes and standards of living. The total of BART-induced property taxes and sales taxes that each

Construction of the parking lot at BART's El Cerrito Plaza Station. *Most of the financing for BART's construction bonds has been derived from local property taxes. Households contribute about two-thirds of the revenue raised by these taxes, and a similar fraction of the local sales tax that pays for most of BART's operating deficit.*

group would pay was computed and expressed as a percentage of household income. The results of this analysis are summarized in the table below. The BART tax burden clearly decreases as household income increases. The greatest relative burdens fall on a poor family of four with female head of household, and on a retired individual with a low income. The lightest burden is borne by an affluent family of four.

Impact of BART Bonds on Public Finance

In 1962, BART's general-obligation bond issue represented the largest single local bond issue in history. Because of its size and the resultant increase in local tax burdens, it might have increased the cost of borrowing for other projects. Or, if it were interpreted by the financial community as an encouragement to future growth that would support further general-obligation debt, it might have lowered the cost of borrowing for other projects.

Statistical analyses, and interviews with bond underwriters and traders, indicated that neither of these effects had occurred to any significant degree. Specifically:

- BART's bond issue caused no perceptible change in the cost of money borrowed by other public bodies.
- None of the major bond-ranking services that determine the credit ratings of public agencies had reduced its rating of any agency within the BART counties.
- None of the traders interviewed thought that BART's heavy debt had deterred investors from buying bonds issued by other bodies in the BART counties.
- BART's borrowing didn't cause other agencies to seek financing by unusual means, or to defer or abandon new capital projects. (Since 1966, many public projects in California have been financed by nonprofit-corporation bonds, which needn't be approved by voters. But the trend toward this financing mechanism is evident throughout California; it is unrelated to the financing of BART).

These findings, of course, reflect attitudes and events during the years from the early 1960s to the early 1970s. Since then, the climate for public borrowing has changed substantially. Several cities — New York and Cleveland are notable examples — have brought themselves close to insolvency through their borrowing and spending. And taxpayers in many areas have sought to limit public spending, directly or indirectly, by supporting measures such as the property-tax-limitation initiative (Proposition 13) that was passed in California in 1978. As a result, a jurisdiction that today considers borrowing to finance a rapid-transit system can't assume that its bond issues will have as little financial impact as BART's bonds had.

BART tax burdens (dollars)

household	annual income (dollars)	property tax	sales tax	total burden	total burden as percentage of income
family of 4 with female head of household (poor)	2,362	12.23	8.65	20.88	0.88
retired person, aged 65 or older (low)	4,489	25.22	18.16	43.88	0.97
couple with head of household retired and aged 65 or older (low to moderate)	6,851	27.05	25.95	53.00	0.77
individual (low to moderate)	10,041	17.88	29.41	47.29	0.47
family of 3 (moderate)	14,411	38.20	30.27	68.47	0.48
couple (moderate)	15,711	39.58	38.92	78.50	0.50
family of 4 (high)	21,735	45.85	53.62	99.47	0.46
family of 4 (affluent)	45,715	80.39	72.65	153.04	0.33

The impact of BART taxes on households in 1976. *The word or words in parentheses describe each household's standard of living. About 89% of the revenues from the BART property tax was applied to capital costs, while 11% was used for operating expenses. The corresponding figures for sales-tax revenues were 54% and 46%.*

5 Economic Impacts of Operating BART

In keeping with the Program's assessment of impacts in terms of differences between alternatives, the economic impacts of BART's operations were defined as the net between actual values for the with-BART system and estimates for the hypothetical No-BART Alternative.

The Net Cost of Operating BART

BART's operating expense in 1976 was about $56 million. The combined operating expenses of AC Transit, Western Greyhound and San Francisco's MUNI were $113 million. Hence the total operating expense of the with-BART public-transit system in 1976 was $169 million.

If BART hadn't been built, the No-BART Alternative suggests, the combined operating expenses of AC Transit, Western Greyhound and MUNI in 1976 would have been $122 million.

The net cost of operating BART in 1976, therefore, was $47 million – the difference between $169 million and $122 million. This is the amount that the three BART counties spent for public transportation in 1976, beyond the amount that they would have spent if BART hadn't been built.

Impact on Regional Sales and Income

The impact of BART's operating expenditures on total sales and income in the Bay Area in 1976 was about $149 million. This was the increment in the gross regional product due to the multiplied effect of the net cost ($47 million) of operating BART. It includes net indirect and induced sales and income generated by BART's direct expenditures.

Impacts on Regional Employment

BART's staff in 1976 was about 1,865 persons. If BART hadn't been built, the public-transit elements of the NBA would have needed 600 more employees in 1976 than they actually had in that year. Hence BART's direct impact on employment was the creation of about 1,265 jobs.

The indirect and induced impacts of BART's spending created at least 1,750 more permanent jobs, so BART's total impact was more than 3,000 jobs.

BART's Employment of Women and Minorities

The Economics and Finance Project compared BART's staff with the combined staffs of MUNI and AC Transit. The results are summarized in the table in the next column.

MUNI and AC Transit have a somewhat higher percentage of minority employees than BART does. About 64% of MUNI and AC Transit's employees are in the category that includes drivers and mechanics, and 60% of the workers in that category are members of minority groups. BART has a similar percentage of minority workers in the same category, but the category represents only 12% of BART's staff.

BART employs a higher percentage of women than MUNI and AC Transit do; and BART pays its women more. Most of BART's women employees are in clerical positions, but significant numbers work as professionals or in service or maintenance jobs.

Impact on Personal Income

The direct, indirect and induced effects of BART's operating expenditures in 1976 expanded personal income in the Bay Area by about $52 million.

Some 22% of this increment went to members of minority groups. They gained a larger part of BART's operating expenditures than of its capital outlays, because there are proportionally more minority workers in BART's operating force than there were in its construction force.

	percentages	
	BART	**AC Transit and MUNI**
minorities as % of entire staff	40	49
women as % of entire staff	19	9
% of staff paid $16,000 or more	73	45
% of minorities paid $16,000 or more	66	48
% of women paid $16,000 or more	41	5
% of staff paid $25,000 or more	5	4
minorities as % of those paid $25,000 or more	14	30
women as % of those paid $25,000 or more	2	less than 1

Employment and remuneration of women and minorities. *This table compares the BART staff with the combined staffs of MUNI and AC Transit. BART pays $16,000 a year or more to a higher percentage of its entire staff, a higher percentage of its minority workers and a much higher percentage of its women workers.*

6 Financial Impacts of Operating BART

Operating Deficit

BART's operating expense in 1976 was $56 million and its income from fares was about $23 million. The resultant operating deficit — some $32 million — was supported chiefly by revenue from the 0.5% sales tax.

Other revenue that helped to cover the deficit came from property taxes, Federal grants and interest on BART's bank deposits.

Property taxes provide funds for paying BART's administrative costs and for servicing its general-obligation bonds. The tax rate is 1.25¢ per $100 of assessed value. The revenues from this tax have fallen sharply since the passing of Proposition 13. That measure precipitated substantial reductions in assessed valuations throughout the State of California.

Distribution of Property-Tax and Sales-Tax Burdens

The distribution of the property-tax and sales-tax burdens created by operating BART are identical to the distribution of the corresponding burdens engendered by the construction of BART. See Section 4 of this report.

BART's Fare Revenues versus Patrons' Incomes

The commuters who ride BART pay most of its fares, make the largest contribution toward covering its operating costs and benefit most from its service.

Analysis of data from a 1976 survey of BART patrons showed that the average fare paid increased with patrons' income. This finding reflects the fact that the more affluent patrons tend to live farther from the major employment centers in Oakland and San Francisco.

7 BART's Impacts on Regional Economic Development

Proponents of a new rapid-transit system often suggest that the system will enhance its service area's competitive position by expanding employment opportunities, enabling businesses to operate more efficiently, and promoting better utilization of the region's resources. The Economics and Finance Project found little quantitative evidence that BART had contributed substantially to any of these objectives in the Bay Area.

Impact on Employers' Access to Labor

In principle, a transit system might enhance economic development by giving employers better access to a larger work force. It would do this by reducing travel times between industrial sites and residential areas.

Comparisons between the with-BART public-transit system and the No-BART Alternative showed that BART has done this in some corridors. For travel to 50 major centers of employment, the average with-BART trip was 8 minutes (19%) shorter than the average No-BART trip. The with-BART advantage was greatest for trips from outlying suburbs to destinations in central Oakland, Berkley and San Francisco. This is consistent with BART's major role as a commuter railway, carrying middle-class suburban residents to their urban workplaces. Residents of urban centers with high unemployment rates also experience reduced travel time to employment centers. But the average reduction is only 5 minutes. This is hardly enough to affect job opportunities or total employment.

Impact on the Efficiency of Businesses

A rapid-transit system might improve the efficiency of local businesses if it were used in interpersonal or inter-office communication. About 10% of the off-peak trips recorded during the 1976 patronage survey were business trips, but extensive interviewing provided no evidence that such trips had increased business efficiency.

Because BART's four San Francisco stations are concentrated beneath a 1.5-mile stretch of Market Street, BART can't be expected to play a large role in circulating people *within* that city's central business district (CBD). But BART could enhance circulation *between* the CBDs of Oakland, Berkeley and San Francisco. BART's scheduled running time between Oakland's and San Francisco's CBDs is 10 minutes; between Berkeley's and San Francisco's, 21 minutes.

As the regional economy grows, some businesses with ties to San Francisco may find it efficient to locate in the less expensive CBDs and use BART as a link to San Francisco.

The San Francisco skyline, seen from Oakland. *Employment in finance, government, service industries and corporate headquarters activities has grown vigorously in the Bay Area since 1962, but BART has had no measurable influence on this growth.*

Impact on Regional Growth

The Economics and Finance Project compared changes in employment within 66 Bay Area industries or industry groups with corresponding changes in 16 other metropolitan areas that are important centers for corporate headquarters. The Project also compared the growth of employment in the BART counties with the growth of employment in the whole Bay Area. Neither comparison disclosed a measurable effect attributable to BART.

Although five industry groups – government, central office activity, services, financing and manufacturing – have shown more rapid growth in the Bay Area than can be explained by national or industry trends since 1962, extensive interviews failed to disclose any influence by BART on this growth. The interviews showed that BART has had no effect on interregional relocations, but it does influence some intraregional relocations. Details of these findings appear in the technical reports of the Land Use and Urban Development Project.

Impact on Regional Image

A region's image – its attractiveness or reputation as a growth center – may influence corporate location decisions. The commercial image of the Bay Area was generally very positive before BART was built, and there is no evidence that a high-technology rapid-transit system enhanced it significantly. On the other hand, BART might have reinforced expectations of a high level of transit service within the region. Even before BART, the central Bay Area already had a good public transit system. Its most heavily used unit, the San Francisco MUNI, offered some of the most concentrated service in the country, and had a correspondingly high ridership. The business community, seeking to ensure a growing local economy, perceived the need for a new transit element to carry commuters between the suburbs and the CBDs. Hence it may be said that BART was a consequence – not a cause – of vigorous business activity.

Implications for Other Regions

BART's Lack of Regional Economic Effects The Composite Report of 1962 described benefits of BART to the voters who would decide whether to finance its construction. "The rapid transit system," the report said, "would improve the area's living and working conditions, economic efficiency and availability of workers, and attract a larger share of the nation's future growth."

Similar expectations are still commonly expressed in support of plans for transportation projects.

A new rapid-transit system may have impacts on decisions by businesses or industries *within* the region. But these impacts do not affect the region's ability to compete with other regions for a share of the nation's growth. The commercial development that has occurred

near rapid-transit stations in other metropolitan areas – so frequently cited as evidence of transit's impact on regional economic development – may merely represent relocation within the region, not new growth induced by transit.

Transportation unquestionably is a necessary condition for maintaining urban vitality; but it is not a sufficient condition. Transportation should support a broader strategy of economic development. Transportation decisions must be integrated with economic, housing and urban-development policies.

BART's Operating Deficit The Composite Report said that BART's fares and concession revenues would not only cover operating expenses but also help to repay some of the bonded debt for capital costs. That expectation soon was abandoned. In 1976, BART's farebox ratio – fare revenue expressed as a percentage of operating expense – was about 41%. In 1977, it was 36%. This was comparable to the ratios reported by MUNI and AC Transit.

A California law passed in 1977 requires public-transit operators to cover 33% of their operating expenses from the farebox to qualify for subsidies from the 0.5% tax on retail sales. This restriction reflects recent experience with public transportation throughout the nation. Planners of new transit systems now are required (by practical considerations and by Federal policy) to produce a realistic financing plan, which in practice means showing an acceptable farebox ratio, and limiting operating deficits to levels that can be funded from available public sources.

BART's Minor Effect on the Gross Regional Product The total impact of the money spent to construct and equip BART was more than $3 billion. This seems to be an impressive amount; but spread over 13 years and put into a regional economy that already was vigorous, it produced very small annual effects in the Gross Regional Product. Furthermore, these effects weren't peculiar to rapid-transit construction. Very similar effects would have resulted from investing the same amount in some other public facilities, such as sewage-treatment or water-supply systems. When large rapid-transit systems are proposed elsewhere as regional economic stimulants, they should be regarded as short-term contributors to the GRP, no different from the other bits and pieces that make up the whole.

8 Technical Literature

These MTC publications provide further information about the BART Impact Program and the Economics and Finance Project. All of them are available from the National Technical Information Service (Springfield, Virginia).

Reports by the Economics and Finance Project

The Economic and Financial Impacts of BART: Final Report
Report No. DOT-BIP-FR 8-7-77.

The Economic Impacts of BART Capital and Operating Expenditures
Report No. DOT-BIP-TM 29-7-77

The Distribution of the Tax Burden of Financing BART's Construction and Operations
Report No. DOT-BIP-TM 30-7-77

The Impact of BART on the Competitive Advantage and Efficiency of Bay Area Business Operations
Report No. DOT-BIP-TM 26-7-77

The Impact of BART's Bond Issue on Regional Public Financing
Report No. DOT-BIP-TM 27-7-77

Other Reports by the BART Impact Program

Environmental Impacts of BART: Final Report
Report No. DOT-BIP-FR 7-4-77

BART's First Five Years: Transportation and Travel Impacts
Report No. DOT-BIP-FR 11-3-78

Impacts of BART on Bay Area Institutions and Lift Styles: Final Report
Report No. DOT-BIP-FR 10-6-77

The Impact of BART on Public Policy: Final Report
Report No. DOT-BIP-FR 13-8-78

The Impact of BART on Land Use and Urban Development: Final Report
Report No. DOT-BP-FR 14-5-78

BART in the Bay Area
Report No. DOT-BIP-FR 9-201-78

This is the final report of the BART Impact Program. It summarizes and integrates the findings of the program's several projects.